DIAGNOSIS

SYSTEM DIAGNOSIS

DIAGNOSTIC AIDS

If an intermittent problem is evident, follow the guidelines below.

Preliminary Checks

Before using this section you should have already performed the ”On–Board Diagnostic System Check.”

Perform a thorough visual inspection. This inspection can often lead to correcting a problem without further checks and can save valuable time. Inspect for the following conditions:

- Powertrain control module (PCM)/engine control module (PCM/ECM) grounds for being clean, tight, and in their proper location.
- Vacuum hoses for splits, kinks, collapsing and proper connections as shown on the Vehicle Emission Control Information label. Inspect thoroughly for any type of leak or restriction.
- Air leaks at the throttle body mounting area and the intake manifold sealing surfaces.
- Ignition wires for cracks, hardness, proper routing, and carbon tracking.
- Wiring for proper connections.
- Wiring for pinches or cuts.

Diagnostic Trouble Code Tables

Do not use the diagnostic trouble code (DTC) tables to try to correct an intermittent fault. The fault must be present to locate the problem.

Incorrect use of the DTC tables may result in the unnecessary replacement of parts.

Faulty Electrical Connections or Wiring

Most intermittent problems are caused by faulty electrical connections or wiring. Perform a careful inspection of suspect circuits for the following:

- Poor mating of the connector halves.
- Terminals not fully seated in the connector body.
- Improperly formed or damaged terminals. All connector terminals in a problem circuit should be carefully inspected, reformed, or replaced to insure contact tension.
- Poor terminal–to–wire connection. This requires removing the terminal from the connector body.

Road Test

If a visual inspection does not find the cause of the problem, the vehicle can be driven with a voltmeter or a scan tool connected to a suspected circuit. An abnormal voltage or scan tool reading will indicate that the problem is in that circuit.

If there are no wiring or connector problems found and a DTC was stored for a circuit having a sensor, except for DTC P0171 and DTC P0172, replace the sensor.

Intermittent Service Reminder Indicator (SRI) Lamp

An intermittent service reminder indicator (SRI) lamp with no DTC present may be caused by the following:

- Electrical system interference caused by a defective relay, PCM/ECM driven solenoid, or switch.
- Improper installation of electrical options such as lights, two–way radios, sound systems, or security systems.
- Ignition control wires should be routed away from ignition wires, ignition system components, and the generator.
- Ignition secondary wires shorted to ground.
- SRI lamp driver wire or diagnostic test terminal intermittently shorted to ground.
- Intermittent lose of PCM/ECM ground connections.

Fuel System

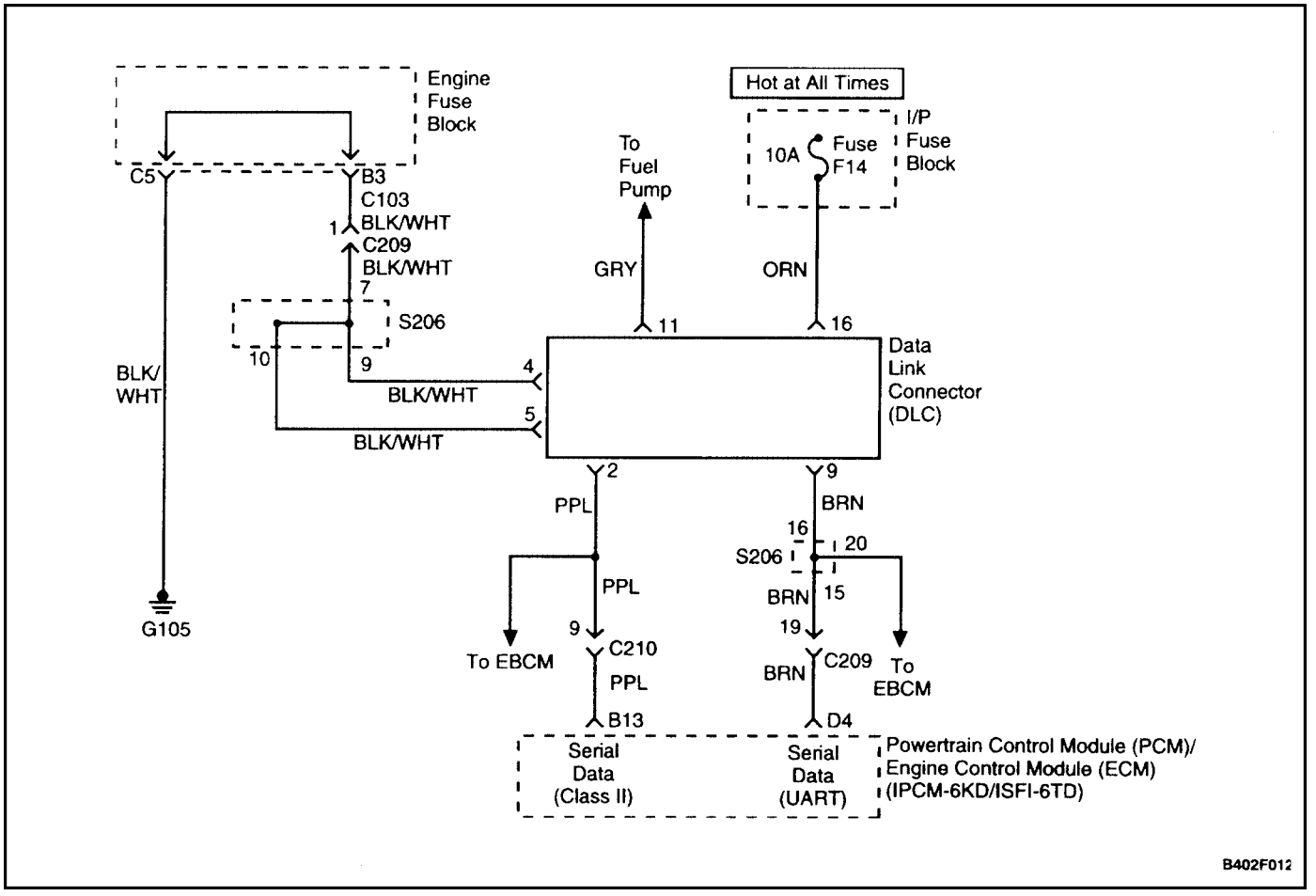
Some intermittent driveability problems can be attributed to poor fuel quality. If a vehicle is occasionally running rough, stalling, or otherwise performing badly, ask the customer about the following fuel buying habits:

- Do they always buy from the same source? If so, fuel quality problems can usually be discounted.
- Do they buy their fuel from whichever fuel station that is advertising the lowest price? If so, check the fuel tank forsigns of debris, water, orothercontamination.

IDLE LEARN PROCEDURE

Whenever the battery cables, the powetrain control module (PCM)/engine control module (PCM/ECM), or the PCM/ECM fuse is disconnected or replaced, the following idle learn procedure must be performed:

1. Turn the ignition ON for 5 seconds.
2. Turn the ignition OFF for 5 seconds.
3. Turn the ignition ON for 5 seconds.
4. Start the engine in park/neutral.
5. Allow the engine run until the engine coolant is above 85˚C (185˚F).
6. Turn the A/C ON for 10 seconds, if equipped.
7. Turn the A/C OFF for 10 seconds, if equipped.
8. If the vehicle is equipped with an automatic transaxle, apply the parking brake. While pressing the brake pedal, place the transaxle in D (drive).
9. Turn the A/C ON for 10 seconds, if equipped.
10. Turn the A/C OFF for 10 seconds, if equipped.
11. Turn the ignition OFF. The idle learn procedure is complete.



ON–BOARD DIAGNOSTIC (OBD II) SYSTEM CHECK

Circuit Description

The On–Board Diagnostic (OBD II) System Check is the starting point for any driveability complaint diagnosis. Before using this procedure, perform a careful visual/physical check of the powertrain control module (PCM)/engine control module (ECM) and the engine grounds for cleanliness and tightness.

The OBD II System Check is an organized approach to identifying a problem created by an electronic engine control system malfunction.

Diagnostic Aids

An intermittent may be caused by a poor connection, rubbed–through wire insulation or a wire broken inside the insulation. Check for poor connections or a damaged harness. Inspect the PCM/ECM harness and connections for improper mating, broken locks, improperly formed or damaged terminals, poor terminal–to–wire connection, and damaged harness.

Test Description

Numbers below refer to the step number on the Diagnostic Chart:

1. The Malfunction Indicator Lamp (MIL) should be ON steady with the ignition ON and the engine OFF. If not, go to ”Diagnostic Aids”.
2. Checks the Class 2 data circuit and ensures that the PCM/ECM is able to transmit serial data.
3. This test ensures that the PCM/ECM is capable of controlling the MIL and the MIL driver circuit is not shorted to ground.
4. If the engine will not start, refer to ”Engine Cranks But Will Not Run” in this section.
7. A scan tool parameter which is not within the typical range may help to isolate the area which is causing the problem.
10. This vehicle is equipped with a PCM/ECM which utilizes an electrically erasable programmable read only memory (EEPROM). The replacement PCM/ECM must be programmed. Refer to the latest Techline procedure for PCM/ECM reprogramming.

On–Board Diagnostic (OBD II) System Check

Step	Action	Value(s)	Yes	No
1	1. Ignition ON, engine OFF. 2. Observe the malfunction indicator lamp (MIL) Is the MIL on?		Go to *Step 2*	Go to ”No Malfunction Indicator Lamp”
2	1. Ignition OFF. 2. Install the scan tool. 3. Ignition ON. 4. Attempt to display the powertrain control module (PCM)/engine control module (ECM) engine data with the scan tool. Does the scan tool display the PCM/ECM engine data?		Go to *Step 3*	Go to *Step 8*
3	1. Using the scan tool output test function, select MIL dash lamp control and command the MIL OFF. 2. Observe the MIL. Does the MIL turn OFF?		Go to *Step 4*	Go to ”Malfunction Indicator Lamp on Steady”
4	Attempt to start the engine. Does the engine start and continue to run?		Go to *Step 5*	Go to ”Engine Cranks But Will Not Run”
5	Select DISPLAY DTC with the scan tool. Are any Diagnostic Trouble Codes (DTCs) stored?		Go to *Step 6*	Go to *Step 7*
6	Check the display for DTCs P0107, P0108, P0113, P0118, P0122, P0123, P0712, P1392. Are two or more of the following DTCs stored?		Go to ”Multiple PCM/ECM Information Sensor DTCs Set”	Go to applicable DTC table
7	Compare the PCM/ECM data values displayed on the scan tool to the typical engine scan data values. Are the displayed values normal or close to the typical values?		Go to ”PCM/ECM Output Diagnosis”	Go to indicated component system check
8	1. Ignition OFF, disconnect the PCM/ECM. 2. Ignition ON, engine OFF. 3. Check the class 2 data circuit for an open, short to ground, or short to voltage. Also, check the Data Link Connector (DLC) ignition feed circuit for an open or short to ground and the DLC ground circuits for an open. Is a problem found?		Go to *Step 9*	Go to *Step 10*
9	Repair the open, short to ground or short to voltage in the class 2 data circuit or the DLC ignition feed circuit or DLC ground circuts. Is the repair complete?		System OK	
10	1. Attempt to reprogram the PCM/ECM. 2. Attempt to display the PCM/ECM data with the scan tool. Does the scan tool display PCM/ECM engine data?		Go to *Step 2*	Go to *Step 11*
11	Replace the PCM/ECM. Is the repair complete?		System OK	

PCM/ECM OUTPUT DIAGNOSIS

Circuit Description

The powertrain control module (PCM)/engine control module (ECM) controls most components with electronic switches which complete a ground circuit when turned on. These switches are arranged in groups of 4 and 7, and are called either a surface mounted quad driver module, which can independently control up to 4 output terminals or an Output Driver Module (ODM), which can independently control up to 7 outputs. Not all of the outputs are always used.

Drivers are fault protected. If a relay or solenoid is shorted, having very low or zero resistance, or if the control side of the circuit is shorted to voltage, it would allow too much current flow into the PCM/ECM. The driver senses this and the output is turned OFF or its internal resistance increases to limit current flow and protect the PCM/ECM and driver. The result is high output terminal voltage when it should be low. If the circuit from B+ to the component or the component is open, or the control side of the circuit is shorted to ground, terminal voltage will be low. Either of these conditions is considered to be a driver fault.

Drivers also have a fault line to indicate the presence of a current fault to the PCM/ECM's central processor. A scan tool displays the status of the driver fault lines as 0=OK and 1=Fault.

Diagnostic Aids

The scan tool has the ability to command certain components and functions ON and OFF. If a component or function does not have this capability, operate the vehicle during its normal function criteria to check for an open or shorted circuit.

An open or short to ground will appear in the open positions on the scan tool only when it is not commanded by the PCM/ECM or the scan tool, while a short to voltage will appear in the short positions on the scan tool only while the component is being commanded by the PCM/ECM or scan tool.

Test Description

Number(s) below refer to the step number(s) on the Diagnostic Table.

1. The Powertrain On–Board Diagnostic (OBD II) System Check prompts the technician to complete some basic checks and store the freeze frame and failure records data on the scan tool if applicable. This creates an electronic copy of the data taken when the malfunction occurred. The information is then stored on the scan tool for later reference.
2. A 1 in any of the positions indicates that an open or short is present in the corresponding circuit for that position.
4. An open or short to ground will appear in the open positions on the scan tool only when it is not commanded by the PCM/ECM or scan tool, while a short to voltage will appear in the short positions on the scan tool only while the component is being commanded by the PCM/ECM or scan tool.
5. Proper operation of any component of function with no 1 in any operation of the positions indicates that system operation is normal at this time.
6. A component or function that failed to operate at this point indicates that the fault is not on the PCM/ECM side of the circuitry.
8. The 1 going away after disconnecting the component electrical connector indicates that the component or component side wiring is at fault. If the scan tool indicates a fault after disconnecting the component electrical connector and verifying that no open or short is present in the circuit, then the PCM/ECM is faulty.
9. The replacement PCM/ECM must be reprogrammed. Refer to the latest Techline procedure for PCM/ECM reprogramming.
10. If no faults have been found at this point, refer to "Diagnostic Aids" in this section for additional checks and information.

PCM/ECM Output Diagnosis

Step	Action	Value(s)	Yes	No
1	Perform an On–Board Diagnostic (OBD II) System Check. Is the check performed ?		Go to *Step 2*	Go to ”On–Board Diagnostic System Check”
2	Install the scan tool. Is there a number 1 below any of the numbered positions in the OUTPUT DRIVERS?		Go to *Step 3*	Go to *Step 4*
3	Check for an open or shorted circuit in any corresponding position (circuit) that contained a number 1 and repair as necessary. Is a repair necessary?		Go to *Step 10*	Go to *Step 8*
4	Command the output being checked with a scan tool while watching the corresponding position for each circuit. Do any of the positions change to a 1?		Go to *Step 7*	Go to *Step 5*
5	Command the output being checked with a scan tool while watching the corresponding position for each circuit. Does the component or function operate when commanded?		Go to *Step 10*	Go to the appropriate component repair
6	Repair the short to voltage in the corresponding circuit for position (circuit) that displayed a 1. Is the repair complete?		Go to *Step 10*	
7	Disconnect the electrical connector to the component connected to the faulty circuit. Is a 1 still displayed in the corresponding OUTPUT DRIVER position?		Go to *Step 9*	Go to the appropriate component repair
8	Replace the powertrain control module (PCM)/engine control module (ECM) Is the repair complete?		Go to *Step 10*	
9	Operate the vehicle within the conditions under which the original symptom was noted. Does the system now operate properly?		System OK	Go to *Step 2*

MULTIPLE PCM/ECM INFORMATION SENSOR DTCS SET

Circuit Description

The powertrain control module (PCM)/engine control module (ECM) monitors various sensors to determine engine operating conditions. The PCM/ECM controls fuel delivery, spark advance, transaxle operation, and emission control device operation based on the sensor inputs.

The PCM/ECM provides a sensor ground to all of the sensors. The PCM/ECM applies 5 volts through a pullup resistor and monitors the voltage present between the sensor and the resistor to determine the status of the Engine Coolant Temperature (ECT) sensor, the Intake Air Temperature (IAT) sensor, and the Transmission Fluid Temperature (TFT) sensor. The PCM/ECM provides the Exhaust Gas Recirculation (EGR) Pintle Position Sensor, the Throttle Position (TP) sensor, the Manifold Absolute Pressure (MAP) sensor, the Air Conditioning Temperature (ACT) sensor and the Fuel Tank Pressure Sensor with a 5 volt reference and a sensor ground signal. The PCM/ECM monitors the separate feedback signals from these sensors to determine their operating status.

Diagnostic Aids

Be sure to inspect PCM/ECM and engine grounds for being secure and clean.

A short to voltage in one of the sensor circuits can cause one or more of the following Diagnostic Trouble Codes (DTCs) to be set: P0108, P0113, P0118, P0123, P1106, P1111, P1115, P1121, P1625.

If a sensor input circuit has been shorted to voltage, ensure that the sensor is not damaged. A damaged sensor will continue to indicate a high or low voltage after the affected circuit has been repaired. If the sensor has been damaged, replace it.

An open in the sensor ground circuit between the PCM/ECM and the splice will cause one or more of the following DTCs to be set: P0108, P0113, P0118, P0123, P1106, P1111, P1115, P1121.

A short to ground in the 5 volt reference circuit or an open in the 5 volt reference circuit between the PCM/ECM and the splice will cause one or more of the following DTCs to be set: P0107, P0112, P0117, P0122, P1107, P1112, P1114, P1122.

Check for the following conditions:

- Inspect for a poor connection at the PCM/ECM. Inspect harness connectors for backed–out terminals, improper mating, broken locks, improperly formed or damaged terminals, and poor terminal–to–wire connection.
- Inspect the wiring harness for damage. If the harness appears to be OK, observe an affected sensor's displayed value on the scan tool with the ignition ON and the engine OFF while moving connectors and wiring harnesses related to the affected sensors. A change in the affected sensor's displayed value will indicate the location of the fault.

Test Description

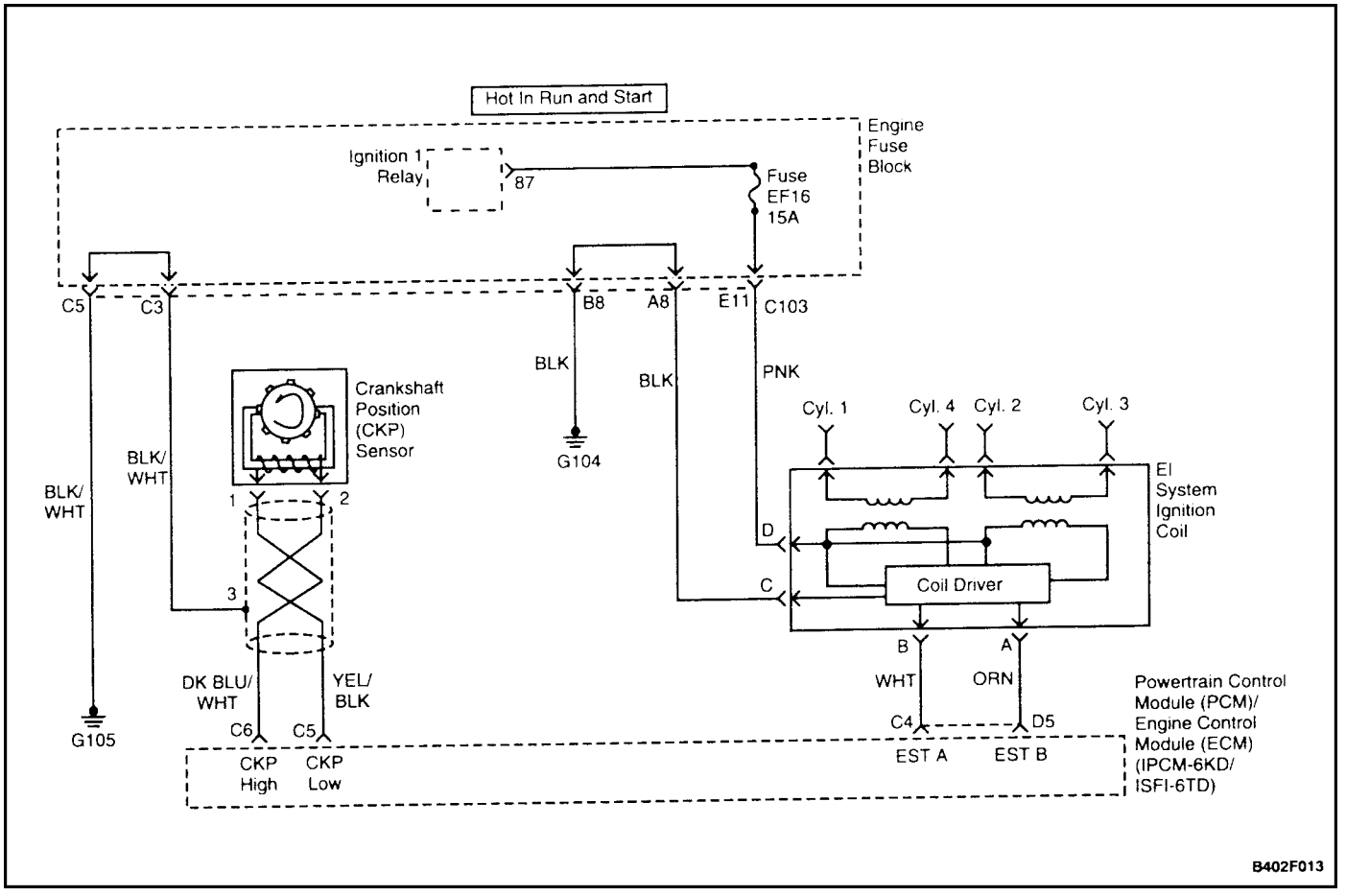
Number(s) below refer to the step number(s) on the Diagnostic Table.

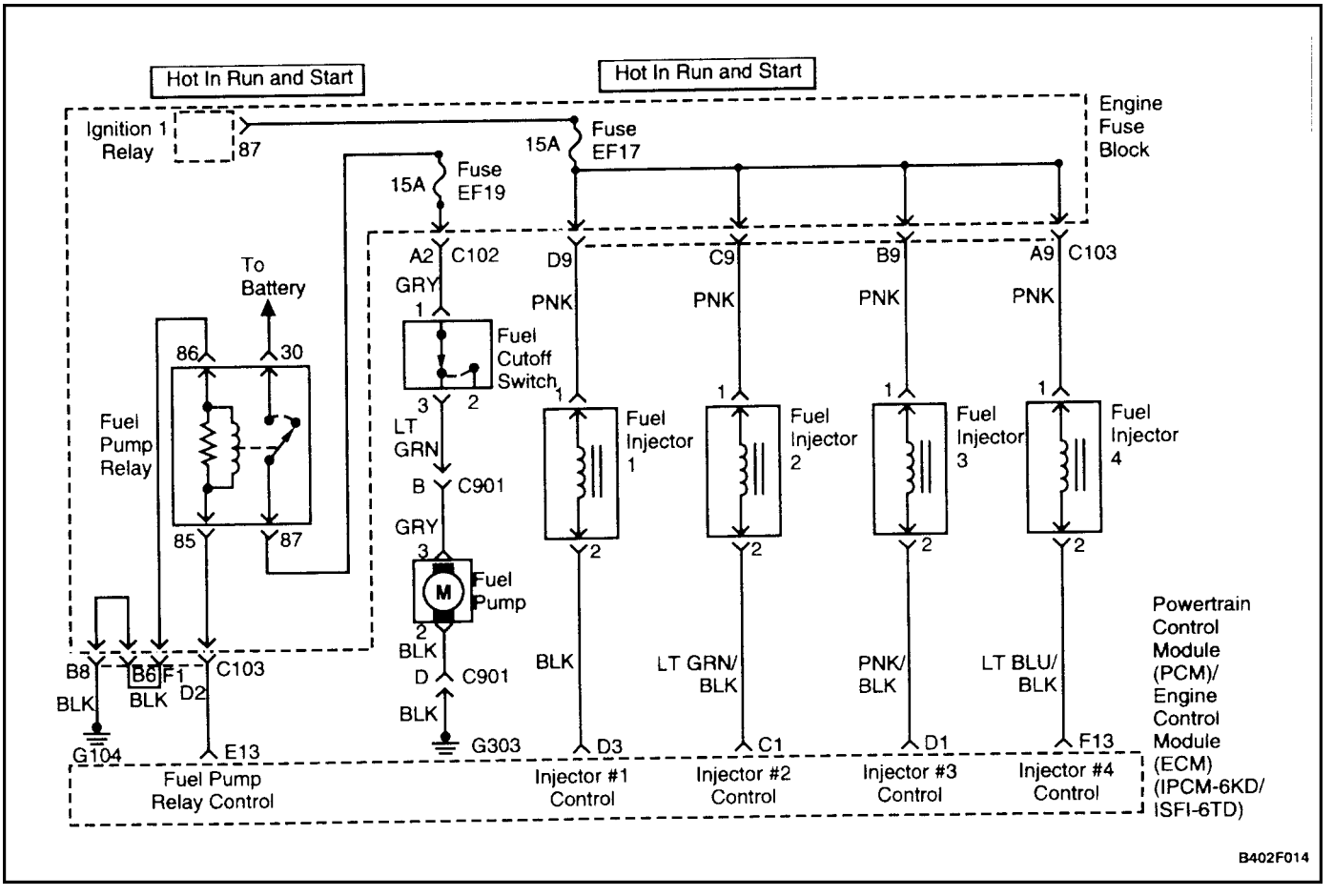
1. The Powertrain On–Board Diagnostic (OBD II) System Check prompts the technician to complete some basic checks and store the freeze frame and failure records data on the scan tool if applicable. This creates an electronic copy of the data taken when the malfunction occurred. The information is then stored on the scan tool for later reference.
9. A faulty EGR valve can leak a small amount of current from the ignition feed circuit to the 5 volt reference circuit. If the problem does not exist with the EGR valve disconnected, replace the EGR valve.
0. If a sensor input circuit has been shorted to voltage, ensure that the sensor has not been damaged. A damaged IAT or ECT sensor will continue to indicate a high voltage or low temperature after the affected circuit has been repaired. A damaged ACT, TP, MAP, Fuel Tank Pressure, or EGR Pintle Position sensor will indicate a high or low voltage or may be stuck at a fixed value after the affected circuit has been repaired. If the sensor has been damaged, replace it.
21. The replacement PCM/ECM must be reprogrammed. Refer to the latest Techline procedure for PCM/ECM reprogramming.

Multiple PCM/ECM Information Sensor DTCs Set

Step	Action	Value(s)	Yes	No
1	Perform an On–Board Diagnostic (OBD II) System Check. Is the system check complete?		Go to *Step 2*	Go to ”On–Board Diagnostic System Check”
2	1. Ignition OFF, disconnect the powertrain control module (PCM)/engine control module (ECM). 2. Ignition ON, check the 5 volt reference circuit for the following conditions: • Poor connection at the PCM/ECM. • Open between the PCM/ECM connector affected sensors shorted to ground or voltage. 3. If a problem is found, locate and repair the open or short circuit as necessary. Is a problem found?		Go to *Step 21*	Go to *Step 3*
3	1. Check the sensor ground circuit for the following conditions: • Poor connection at the PCM/ECM or affected sensors. • Open between the PCM/ECM connector and the affected sensors. 2. If a problem is found, repair it as necessary. Is a problem found?		Go to *Step 21*	Go to *Step 4*
4	Measure the voltage between the Exhaust Gas Recirculation (EGR) Pintle Position Sensor signal circuit at the PCM/ECM harness connector and ground. Does the voltage measure near the specified value?	0 v	Go to *Step 5*	Go to *Step 9*
5	Measure the voltage between the Manifold Absolute Pressure (MAP) sensor signal circuit and the PCM/ECM harness connector and ground. Does the voltage measure near the specified value?	0 v	Go to *Step 6*	Go to *Step 12*
6	Measure the voltage between the Throttle Position (TP) sensor signal circuit and the PCM/ECM harness connector and ground. Does the voltage measure near the specified value?	0 v	Go to *Step 7*	Go to *Step 13*
7	Measure the voltage between the Intake Air Temperature (IAT) sensor signal circuit and the PCM/ECM harness connector and ground. Does the voltage measure near the specified value?	0 v	Go to *Step 8*	Go to *Step 14*
8	Measure the voltage between the Engine Coolant Temperature (ECT) sensor signal circuit and the PCM/ECM harness connector and ground. Does the voltage measure near the specified value?	0 v	Go to *Step 10*	Go to *Step 15*
9	1. Disconnect the EGR valve. 2. Measure the voltage between the EGR Pintle Position sensor signal circuit and the PCM/ECM harness connector and ground. Does the voltage measure near the specified value?	0 v	Go to *Step 11*	Go to *Step 16*

Step	Action	Value(s)	Yes	No
10	Measure the voltage between the Transmission Fluid Temperature (TFT) sensor signal circuit and the PCM/ECM harness connector and ground. Does the voltage measure near the specified value?	0 v	Go to *Step 18*	Go to *Step 17*
11	Replace the EGR valve. Is the repair complete?		Go to *Step 21*	
12	Locate and repair short to voltage in the MAP sensor signal circuit. Is the repair complete?		Go to *Step 21*	
13	Locate and repair short to voltage in the TP sensor signal circuit. Is the repair complete?		Go to *Step 21*	
14	Locate and repair short to voltage in the IAT sensor signal circuit. Is the repair complete?		Go to *Step 21*	
15	Locate and repair short to voltage in the ECT sensor signal circuit. Is the repair complete?		Go to *Step 21*	
16	Locate and repair short to voltage in the EGR Pintle Position sensor circuit. Is the repair complete?		Go to *Step 21*	
17	Locate and repair short to voltage in TFT sensor circuit. Is the repair complete?		Go to *Step 21*	
18	Measure the voltage between the Fuel Tank Pressure sensor signal circuit and the PCM/ECM harness connector and ground. Does the voltage measure near the specified value?	0 v	Go to *Step 20*	Go to *Step 19*
19	Locate and repair short to voltage in the Fuel Tank Pressure sensor signal circuit. Is the repair complete?		Go to *Step 21*	
20	Replace the PCM/ECM. Is the repair complete?		Go to *Step 21*	
21	1. Using the scan tool, clear the Diagnostic Trouble Codes (DTCs). 2. Start the engine and idle at normal operating temperature. 3. Operate the vehicle within the conditions for setting the DTCs as specified in the supporting text. Does the scan tool indicate that this diagnostic ran and passed?		Go to *Step 22*	Go to *Step 2*
22	Check if any additional DTCs are Are any DTCs displayed that have not been diagnosed?		Go to applicable DTC table	System OK


Hot In Run and Start
Ignition 1 Relay
87
Fuse EF16 15A
Engine Fuse Block
C5
C3
B8
A8
E11
C103
BLK
BLK
PNK
G104
Crankshaft Position (CKP) Sensor
BLK/ WHT
BLK/ WHT
1
2
3
Cyl. 1
Cyl. 4
Cyl. 2
Cyl. 3
EI System Ignition Coil
D
C
Coil Driver
B
A
WHT
ORN
C4
D5
EST A
EST B
DK BLU/ WHT
YEL/ BLK
C6
C5
CKP High
CKP Low
G105
Powertrain Control Module (PCM)/ Engine Control Module (ECM) (IPCM-6KD/ ISFI-6TD)
B402F013


Hot In Run and Start
Hot In Run and Start
Ignition 1 Relay
87
15A
Fuse EF17
15A
Fuse EF19
Engine Fuse Block
A2
C102
GRY
1
D9
C9
B9
A9
C103
PNK
PNK
PNK
PNK
To Battery
86
30
Fuel Cutoff Switch
3
2
1
1
1
1
Fuel Pump Relay
85
87
LT GRN
B
C901
GRY
3
Fuel Injector 1
Fuel Injector 2
Fuel Injector 3
Fuel Injector 4
2
2
2
2
M
Fuel Pump
2
BLK
D
C901
BLK
B8
B6
F1
C103
D2
BLK
BLK
G104
E13
G303
BLK
LT GRN/ BLK
PNK/ BLK
LT BLU/ BLK
D3
C1
D1
F13
Fuel Pump Relay Control
Injector #1 Control
Injector #2 Control
Injector #3 Control
Injector #4 Control
Powertrain Control Module (PCM)/ Engine Control Module (ECM) (IPCM-6KD/ ISFI-6TD)
B402F014

ENGINE CRANKS BUT WILL NOT RUN

Test Description

The number(s) below refer to step(s) on the diagnostic table.

3. By performing a compression test, it can be determined if the engine has the mechanical ability to run.
9. It is important to check for the presence of spark from all of the ignition wires. If spark is present from one to three of the ignition coil terminals, the crankshaft position (CKP) sensor is OK.
19. In checking the powertrain control module (PCM)/engine control module (ECM) outputs for the electronic spark timing signal, it recommended to use an oscilloscope to view the varying voltage signals. In measuring these outputs with a voltmeter, intermittent errors may occur that cannot be seen by a voltmeter.
35. This step checks for proper operation of the PCM/ECM's control of the fuel pump circuit.
59. This step checks for a ground signal being supplied by the PCM/ECM to operate the fuel injectors. If there is no ground present during the cranking of the engine, and the fuel injector wiring is OK, the PCM/ECM is at fault.

Engine Cranks But Will Not Run

CAUTION : Use only electrically insulated pliers when handling ignition wires with the engine running to prevent an electrical shock.

CAUTION : Do not pinch or restrict nylon fuel lines to avoid damage that could cause a fuel leak, resulting in possible fire or personal injury.

Important : If engine cranks but will not start, make sure fuel cut–off switch has not been tripped.

Step	Action	Value(s)	Yes	No
1	Perform an On–Board Diagnostic (OBD II) System Check. Is the system check complete?		Go to *Step 2*	Go to "On–Board Diagnostic System Check"
2	Crank the engine. Does the engine start and continue to run?		System OK	Go to *Step 3*
3	Perform a cylinder compression test. Is the cylinder compression for all of the cylinders at or above the value specified?	689 kPa (100 psi)	Go to*Step 7*	Go to*Step 4*
4	Inspect the timing belt alignment. Is the timing belt in alignment?		Go to*Step 6*	Go to*Step 5*
5	Align or replace the timing belt as needed. Is the repair complete?		Go to*Step 2*	
6	Repair the internal engine damage as needed. Is the repair complete?		Go to*Step 2*	
7	Inspect the fuel pump fuse. Is the problem found?		Go to*Step 8*	Go to*Step 9*
8	Replace the fuse. Is the repair complete?		Go to*Step 2*	
9	Check for the presence of spark from all of the ignition wires while cranking the engine. Is spark present from all of the ignition wires?		Go to*Step 34*	Go to*Step 10*
10	1. Measure the resistance of the ignition wires. 2. Replace any of the ignition wire(s) with a resistance above the value specified. 3. Check for the presence of spark from all of the ignition wires. Is spark present from all of the ignition wires?	30,000 Ω	Go to*Step 2*	Go to*Step 11*

Step	Action	Value(s)	Yes	No
11	1. Turn the ignition OFF. 2. Disconnect the Crankshaft Position (CKP) sensor connector. 3. Turn the ignition ON. 4. Measure the voltage between the CKP connector terminals 1 and 3. Does the voltage measure near the value specified?	1.08 volts	Go to*Step 12*	Go to*Step 13*
12	Measure the voltage between the CKP connector terminals 2 and 3. Does the voltage measure near the value specified?	1.08 volts	Go to*Step 19*	Go to*Step 14*
13	Measure the voltage between the CKP connector terminals 1 and ground. Does the voltage measure near the value specified?	1.08 volts	Go to*Step 15*	Go to*Step 16*
14	Measure the voltage between the CKP connector terminals 2 and ground. Does the voltage measure near the value specified?	1.08 volts	Go to*Step 15*	Go to*Step 17*
15	Check for an open or short in the wire between the CKP connector terminal 3 and ground. Is the problem found?		Go to*Step 18*	Go to*Step 33*
16	Check for an open or short in the wire between the CKP connector terminal 1 and the powertrain control module (PCM)/engine control module (ECM) connector terminal C6. Is the problem found?		Go to*Step 18*	Go to*Step 33*
17	Check for an open or short in the wire between the CKP connector terminal 2 and the PCM/ECM connector terminal C5. Is the problem found?		Go to*Step 18*	Go to*Step 33*
18	Repair the wiring as needed. Is the repair complete?		Go to*Step 2*	
19	1. Disconnect the electronic ignition (EI) system ignition coil connector to prevent the vehicle from starting. 2. Measure the voltage at the PCM/ECM connector terminal C6 by backprobing the PCM/ECM connector. Are the voltage readings near the values specified?	1.08 v with ignition ON, 1.20 v during cranking	Go to*Step 20*	Go to*Step 21*
20	Measure the voltage at the PCM/ECM connector terminal C5 by backprobing the PCM/ECM connector. Are the voltage readings near the values specified?	1.08 v with ignition ON, 1.20 v during cranking	Go to*Step 22*	Go to*Step 21*
21	Replace the CKP sensor. Is the repair complete?		Go to*Step 2*	
22	1. Turn the ignition OFF. 2. Disconnect the electrical connector at the EI system ignition coil. 3. Connect a test light between terminal D of the EI system ignition coil connector and ground. 4. Turn the ignition ON. Is the test light on?		Go to*Step 23*	Go to*Step 24*

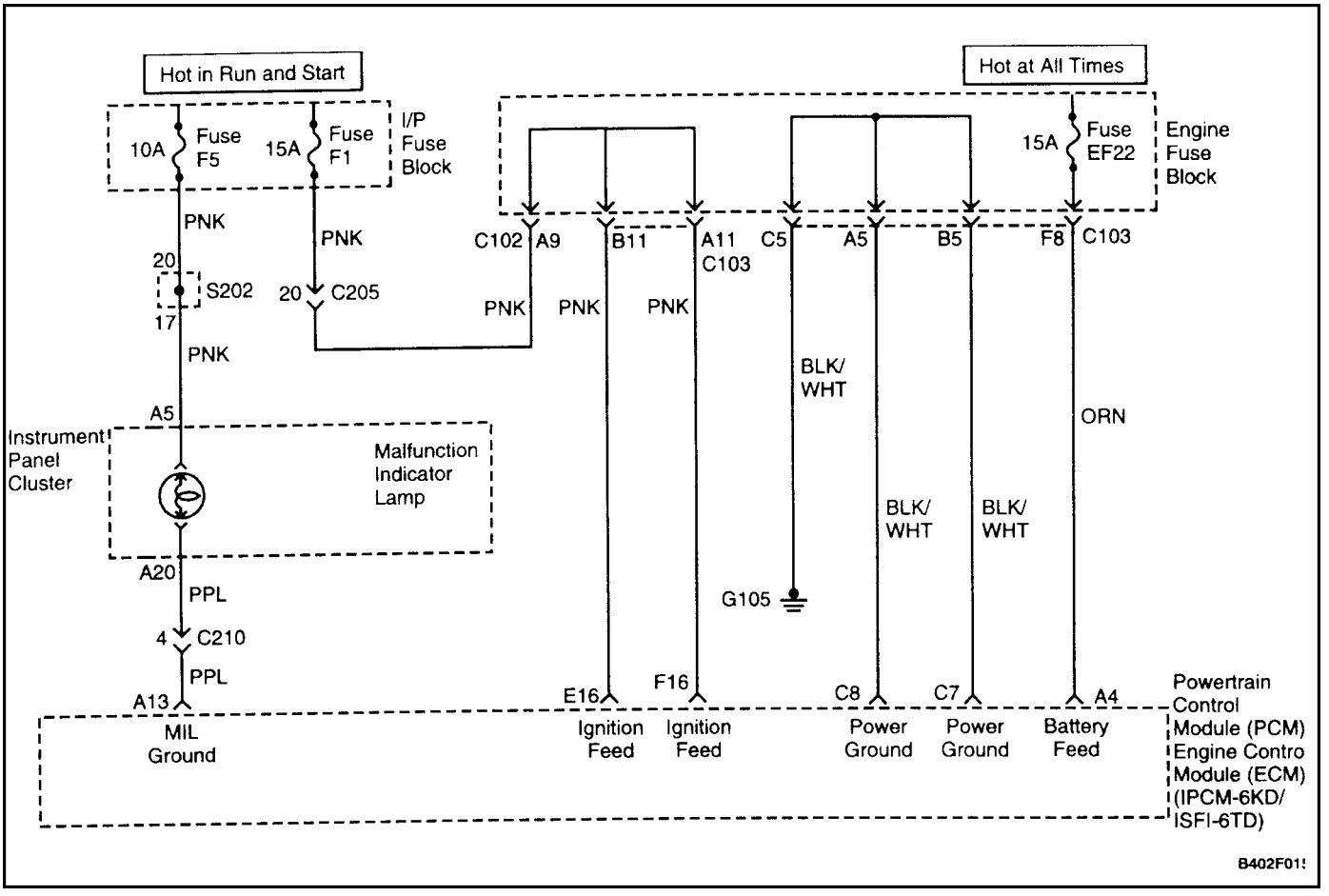
Step	Action	Value(s)	Yes	No
23	Connect a test light between terminal C of the EI system ignition coil connector and battery positive. Is the test light on?		Go to*Step 27*	Go to*Step 25*
24	Check for an open in the wiring between the battery and the EI system ignition coil connector terminal D. Is the problem found?		Go to*Step 26*	Go to"Ignition 1 Relay Circuit Check"
25	Check for an open in the wire from the EI system ignition coil to ground. Is the problem found?		Go to*Step 26*	
26	1. Repair the wiring as needed. 2. Connect the EI system ignition coil connector. 3. Check for the presence of spark from all of the ignition wires. Is spark present from all of the ignition wires?		Go to*Step 2*	Go to*Step 27*
27	1. Turn the ignition OFF. 2. Disconnect the EI system ignition coil connector. 3. While cranking the engine, measure the voltage at the EI system ignition coil connector terminal B. Does the voltage fluctuate within the values specified?	0.2–2.0 v	Go to*Step 28*	Go to*Step 29*
28	While cranking the engine, measure the voltage at the EI system ignition coil connector terminal A. Does the voltage fluctuatewithin the values specified?	0.2–2.0 v	Go to*Step 32*	Go to*Step 30*
29	Check for an open in the wire from the EI system ignition coil connector terminal B to the PCM/ECM connector terminal C4. Is the problem found?		Go to*Step 31*	Go to*Step 33*
30	Check for an open in the wire from the EI system ignition coil connector terminal A to the PCM/ECM connector terminal D5. Is the problem found?		Go to*Step 31*	Go to*Step 33*
31	1. Repair the wiring as needed. 2. Connect the EI system ignition coil connector. 3. Check for the presence of spark from all of the ignition wires. Is spark present from all of the ignition wires?		Go to*Step 2*	Go to*Step 32*
32	Replace the EI system ignition coil. Is the repair complete?		Go to*Step 2*	
33	Replace the PCM/ECM. Is the repair complete?		Go to*Step 2*	
34	1. Turn the ignition OFF. 2. Connect a fuel pressure gauge. 3. Crank the engine. Is any fuel pressure present?		Go to*Step 37*	Go to*Step 35*

Step	Action	Value(s)	Yes	No
35	1. Turn the ignition OFF. 2. Disconnect the electrical connector at the fuel pump. 3. Connect a test light between the fuel pump connector terminals 3 and 2. 4. Turn the ignition ON. 5. With the ignition ON, the test light should light for the time specified. Is the test light on?	2 sec	Go to*Step 36*	Go to*Step 46*
36	Replace the fuel pump. Is the repair complete?		Go to*Step 2*	
37	Is the fuel pressure within the value specified?	283–324 kPa (41–47 psi)	Go to*Step 41*	Go to*Step 38*
38	1. Check the fuel filter for a restriction. 2. Inspect the fuel lines for kinks and restrictions. Is the problem found?		Go to*Step 39*	Go to*Step 40*
39	1. Replace the fuel filter and/or the fuel lines as needed. 2. Connect a fuel pressure gauge. 3. Crank the engine. Is the fuel pressure within the value specified?	283–324 kPa (41–47 psi)	Go to*Step 2*	Go to*Step 40*
40	1. Disconnect the vacuum line from the fuel pressure regulator. 2. Inspect the vacuum line for the presence of fuel. 3. Inspect the fuel pressure regulator vacuum port for the presence of fuel. Is any fuel present?		Go to*Step 43*	Go to*Step 44*
41	Check the fuel for contamination. Is the fuel contaminated?		Go to*Step 42*	Go to*Step 58*
42	1. Remove the contaminated fuel from the fuel tank. 2. Clean the fuel tank as needed. Is the repair complete?		Go to*Step 2*	
43	Replace the fuel pressure regulator. Is the repair complete?		Go to*Step 2*	
44	1. Remove the fuel pump assembly from the fuel tank. 2. Inspect the fuel pump sender and the fuel coupling hoses for a restriction. 3. Inspect the in–tank fuel filter for a restriction. Is the problem found?		Go to*Step 45*	Go to*Step 36*
45	Replace the fuel pump sender, the in–tank fuel filter, and/or the fuel coupling hoses as needed. Is the repair complete?		Go to*Step 2*	

Step	Action	Value(s)	Yes	No
46	1. Turn the ignition OFF. 2. Disconnect the electrical connector at the fuel pump. 3. Connect a test light between the fuel pump connector terminal 3 and a known good ground. 4. Turn the ignition ON. 5. With the ignition ON, the test light should illuminate for the time specified. Is the test light on?	2 sec	Go to*Step 47*	Go to*Step 48*
47	Repair the open wire between the fuel pump connector terminal 2 and ground. Is the repair complete?		Go to*Step 2*	
48	1. Turn the ignition OFF. 2. Disconnect the fuel pump relay. 3. Connect a test light between the fuel pump relay connector terminal 85 and ground. 4. Turn the ignition ON. Is the test light on?		Go to*Step 49*	Go to*Step 60*
49	1. Turn the ignition OFF. 2. Connect a test light between the fuel pump relay connector terminal 86 and terminal 85. 3. Turn the ignition ON. 4. With the ignition ON, the test light should light for the time specified. Is the test light on?	2 sec	Go to*Step 50*	Go to*Step 52*
50	1. Turn the ignition OFF. 2. Connect a test light between the fuel pump relay connector terminal 30 and ground. Is the test light on?		Go to*Step 51*	Go to*Step 63*
51	1. Turn the ignition ON. 2. Measure the voltage at the fuse EF19 connection. Is the voltage within the specified value?	11–14 v	Go to*Step 53*	Go to*Step 52*
52	Replace the fuel pump relay. Is the repair complete?		Go to*Step 2*	
53	Measure the voltage at the fuse EF19 again. Is the voltage within the specified value?	11–14 v	Go to*Step 55*	Go to*Step 54*
54	Replace the engine fuse block. Is the repair complete?		Go to*Step 2*	
55	1. Disconnect the fuel cutoff switch connector. 2. Measure the voltage at terminal 1 of the fuel cutoff switch connector. Is the voltage within the specified value?	11–14 v	Go to*Step 57*	Go to*Step 56*
56	Repair the open or short between the fuel cutoff switch and fuse EF19. Is the repair complete?		Go to*Step 2*	
57	1. Reconnect the fuel cutoff switch. 2. Measure the voltage at terminal 3 of the fuel cutoff switch connector. Is the voltage within the specified value?	11–14 v	Go to*Step 58*	Go to*Step 59*

Step	Action	Value(s)	Yes	No
58	Repair the short or opening the circuit between the fuel cutoff switch and the fuel pump. Is the repair complete?		Go to*Step 2*	
59	Replace the fuel cutoff switch. Is the repair complete?		Go to*Step 2*	
60	Check the wire between the fuel pump relay connector terminal 85 to the PCM/ECM connector terminal E13 for an open. Is the problem found?		Go to*Step 61*	Go to*Step 33*
61	Repair the wire between the fuel pump relay connector terminal 85 to the PCM/ECM connector terminal E13. Is the repair complete?		Go to*Step 2*	
62	Repair the wire between the fuel pump relay connector terminal 30 and the battery. Is the repair complete?		Go to*Step 2*	
63	1. Turn the ignition OFF. 2. Disconnect the fuel injector harness connectors from all of the fuel injectors. 3. Turn the ignition ON. 4. Connect a test light between the fuel injector harness connector 1 and ground. 5. Repeat Step 4 for each of the remaining fuel injectors. Is the test light on at all of the fuel injectors?		Go to*Step 64*	Go to*Step 67*
64	1. Turn the ignition OFF. 2. Connect a test light between the fuel injector harness connector terminal 2 and battery positive. 3. Crank the engine. 4. Repeat Steps 3 and 4 for each of the remaining fuel injectors. Does the test light flash for all of the fuel injectors?		Go to*Step 65*	Go to*Step 68*
65	Measure the resistance of each fuel injector. Is the resistance within the value specified (the resistance will increase slightly at higher temperatures)?	11.6–12.4 Ω	System OK	Go to*Step 66*
66	Replace any of the fuel injectors with a resistance out of specification. Is the repair complete?		Go to*Step 2*	
67	Repair the open wire(s) between the fuel injector harness connector(s) terminal 1 and the battery. Is the repair complete?		Go to*Step 2*	
68	1. Check for an open between the fuel injector harness connector terminal 2 and the PCM/ECM connector terminal C4 for the fuel injectors one and four. 2. Check for an open between the fuel injector harness connector terminal 2 and the PCM/ECM connector terminal C6 for the fuel injectors two and three. Is the problem found?		Go to*Step 69*	Go to*Step 71*

Step	Action	Value(s)	Yes	No
69	Repair the open fuel injector harness wire(s). Is the repair complete?		Go to*Step 2*	
70	Replace the fuse or repair the wiring as needed. Is the repair complete?		Go to*Step 2*	
71	1. Inspect the engine fuse block fuse EF34. 2. Check for an open in the fuel injector connector terminals 1 and the ignition 1 relay connector terminal 87. Is the problem found?		Go to*Step 68*	Go to"Ignition System Check"



NO MALFUNCTION INDICATOR LAMP

Circuit Description

When the ignition is turned ON, the Malfunction Indicator Lamp (MIL) will momentarily flash on and off, then it will remain on until the engine is running if no Diagnostic Trouble Codes (DTC) are stored. Battery voltage is supplied through the ignition switch directly to the MIL telltale. The powertrain control module (PCM)/engine control module (ECM) controls the MIL by providing a ground path through the MIL control circuit to turn on the MIL.

Diagnostic Aids

An open ignition #5 fuse will cause the entire cluster to be inoperative, and may set DTC P1625.

Check the battery and ignition feed circuits for poor connections if the MIL is intermittent.

Any circuitry, that is suspected as causing an intermittent complaint, should be thoroughly checked for backed–out terminals, improper mating, broken locks, improperly formed or damaged terminals, poor terminals–to–wiring connections or physical damage to the wiring harness.

Test Description

Number(s) below refer to the step number(s) on the diagnostic table.

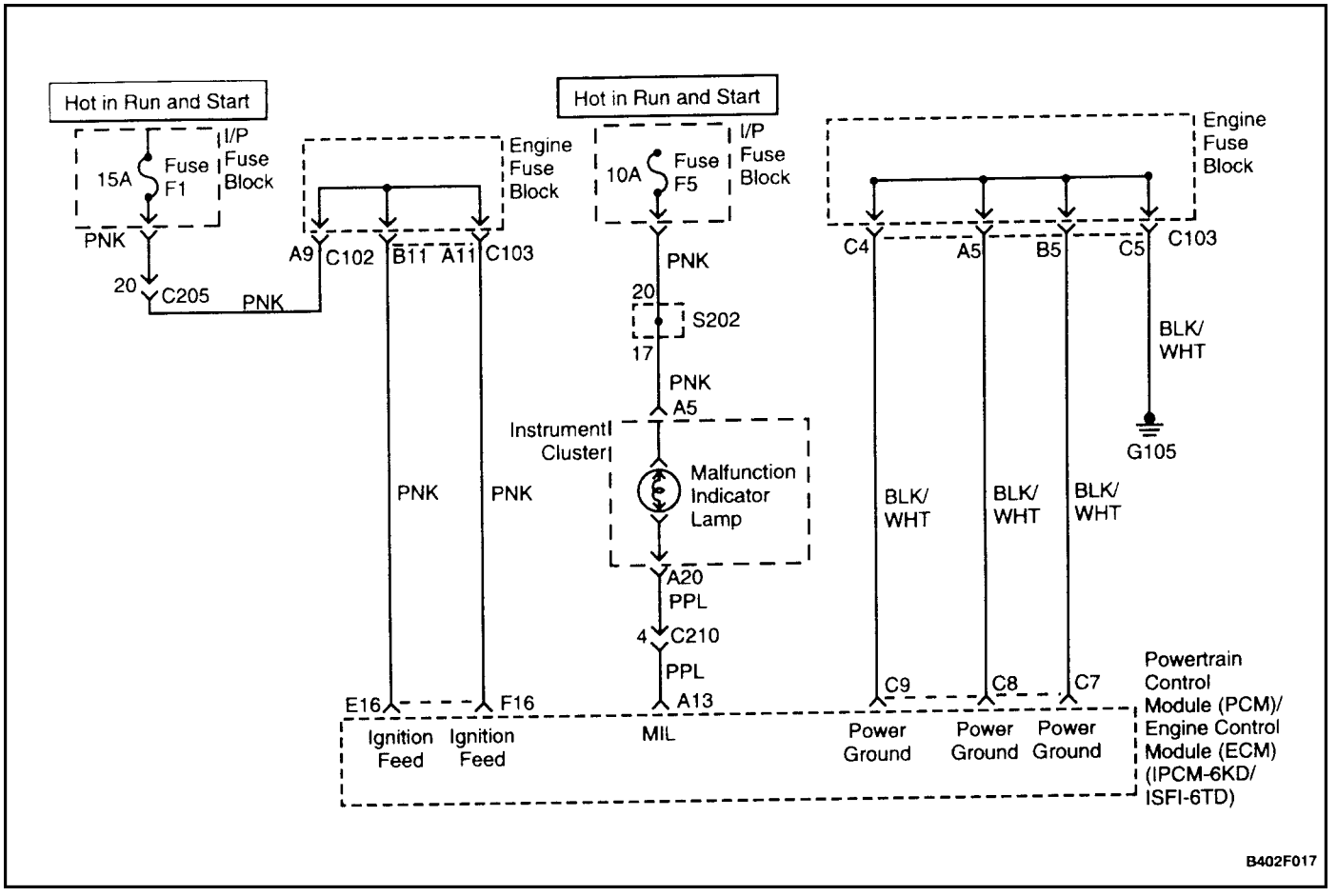
1. The On–Board Diagnostic (OBD II) System Check prompts the technician to complete some basic checks and store the freeze frame and failure records data on then scan tool, if applicable. This creates an electronic copy of the data taken when the malfunction occurred. The information is stored in the scan tool for later reference.
3. Connections that are suspected of being faulty should be thoroughly checked as described in the diagnostic aids.
4. If the engine fails to start and the MIL is inoperative, then the fault can be isolated to either the PCM/ECM ignition feed, The battery feed, or a poor ground at the engine block, or the PCM/ECM.
6. Probing the MIL circuit with a test light to ground stimulates the PCM/ECM's control of the MIL. If the MIL illuminates, then the malfunction can be isolated to the control of the MIL or a poor connection at the MIL terminal to the PCM/ECM. Connections that are suspected of being faulty should be thoroughly checked as described in the diagnostic aids.
8. It takes very little resistance for the battery and ignition feed circuits to cause an intermittent condition and should also be checked for a poor connection as described in diagnostic aids.

11. Before replacing the PCM/ECM, check for backed-out terminals, improper mating, broken locks, improperly formed or damaged terminals, poor terminal–to–wiring harness. Replacement PCM/ECM's must be reprogrammed. Refer to the latest Techline information for reprogramming procedures.
20. PCM/ECM grounds will only cause a problem if all of the grounds are not making a good connection. If a PCM/ECM ground problem is suspected, the most probable place to check is where all the grounds meet, at the engine block.
22. If not faults have been found at this point and no DTCs were set, refer to the diagnostic aids for additional checks and information.

No Malfunction Indicator Lamp

Step	Action	Value(s)	Yes	No
1	Perform an On–Board Diagnostic (OBD II) System Check. Is the system check complete?		Go to *Step 2*	Go to "On–Board Diagnostic System Check"
2	Turn the ignition switch ON, with the engine OFF. Is the Malfunction Indicator Lamp (MIL) on?		Go to *Step 3*	Go to *Step 4*
3	Check for a poor connection at the battery feed terminal A4 or ignition feed terminal F16. Is the problem found and repaired?		Go to *Step 22*	Go to *Step 5*
4	Attempt to start the engine. Does the engine start?		Go to *Step 6*	Go to *Step 5*
5	Check for a faulty powertrain control module (PCM)/engine control module (ECM) ground connection at the engine block or PCM/ECM connector ground terminals and repair as necessary. Is the repair complete?		Go to *Step 22*	
6	1. Turn the ignition OFF. 2. Disconnect the PCM/ECM connectors from the PCM/ECM. 3. Turn the ignition switch ON. Is the MIL ON?		Go to *Step 8*	Go to *Step 9*
7	Inspect the ignition and battery feed fuses. Are the fuses OK?		Go to *Step 10*	Go to *Step 11*
8	Check for a poor connection in the battery feed terminal A4, ignition feed terminal F16 or the MIL control circuits and repair as necessary. Is a repair necessary?		Go to *Step 22*	Go to *Step 12*
9	Probe the MIL control circuit with a test light connected to ground. Is the test light illuminated?		Go to *Step 13*	Go to *Step 14*
10	1. Turn the ignition switch OFF. 2. Disconnect the PCM/ECM connectors from the PCM/ECM. 3. Turn the ignition switch ON. 4. Probe the battery feed terminal A4 with a test light connected to ground. Does the test light illuminate?		Go to *Step 15*	Go to *Step 16*
11	1. Check for a short to ground in the circuit of the fuse that was open and repair if necessary. 2. Replace the open fuse. Is the repair complete?		Go to *Step 22*	

Step	Action	Value(s)	Yes	No
12	Replace the PCM/ECM. Is the repair complete?		Go to *Step 22*	
13	Repair the short to voltage in the MIL control circuit. Is the repair complete?		Go to *Step 22*	
14	Check for an open or a poor connection in the MIL control circuit and repair as necessary. Is the repair necessary?		Go to *Step 22*	Go to *Step 17*
15	With a test light still connected to the ground, probe the ignition feed terminal F16. Does the test light illuminate?		Go to *Step 18*	Go to *Step 19*
16	Repair the open battery feed circuit. Is the repair complete?		Go to *Step 22*	
17	Check for an open ignition feed circuit or fuse to the MIL and repair as necessary. Is the repair necessary?		Go to *Step 22*	Go to *Step 20*
18	Check for a poor connection in the battery feed terminal A4 or the ignition feed terminal F16 and repair as necessary. Is the repair necessary?		Go to *Step 22*	Go to *Step 21*
19	Repair the open in the ignition feed circuit from terminal F16. Is the repair complete?		Go to *Step 22*	
20	Replace the instrument panel cluster. Refer to *Section 9E, Instrumentation/Driver Information.* Is the repair complete?		Go to *Step 22*	
21	Check for a faulty PCM/ECM ground connection at the engine block or PCM/ECM connector and repair as necessary. Is the repair necessary?		Go to *Step 22*	Go to *Step 12*
22	1. Allow the engine to idle until normal operating temperature is reached. 2. Check if any Diagnostic Trouble Codes (DTCs) are set. Are any DTCs displayed that have not been diagnosed?		Go to the applicable DTC table	System OK



MALFUNCTION INDICATOR LAMP ON STEADY

Circuit Description

When the ignition is turned ON, the Malfunction Indicator Lamp (MIL) will momentarily flash on and off, then it will remain on until the engine is running if no Diagnostic Trouble Codes (DTCs) are stored. Battery voltage is supplied through the ignition switch directly to the MIL telltale. The powertrain control module (PCM)/engine control module (ECM) controls the MIL by providing a ground path through the MIL control circuit to turn on the MIL.

Test Description

Number(s) below refer to the step number(s) on the diagnostic table.

1. The On–Board Diagnostic (OBD II) System Check prompts the technician to complete some basic checks and store the freeze frame and failure records data on then scan tool, if applicable. This creates an electronic copy of the data taken when the malfunction occurred. The information is stored in the scan tool for later reference.
2. When the ignition is turned ON, the MIL should momentarily flash on and off, then remain on until the engine is running or if an emission related DTC is stored.
3. This step checks the ability of the PCM/ECM to control the MIL. The scan tool has the ability to command the MIL on and off.
5. A shorted MIL circuit can be diagnosed with a scan tool.
7. The replacement PCM/ECM must be reprogrammed. Refer to the latest Techline information for reprogramming procedures.

Malfunction Indicator Lamp On Steady

Step	Action	Value(s)	Yes	No
1	Perform an On–Board Diagnostic (OBD II) System Check. Is the system check complete?		Go to *Step 2*	Go to ”On–Board Diagnostic System Check”
2	Turn the ignition switch ON, with the engine OFF. Is the Malfunction Indicator Lamp (MIL) on?		Go to *Step 3*	Go to ”No Malfunction Indicator Lamp”
3	1. Install the scan tool. 2. Command the MIL on and off. Does the MIL turn on and off when commanded?		Go to *Step 8*	Go to *Step 4*
4	1. Turn the ignition switch OFF. 2. Disconnect the powertrain control module (PCM)/engine control module (ECM) connectors. 3. Turn the ignition switch ON. Is the MIL off?		Go to *Step 7*	Go to *Step 5*
5	Check the MIL control circuit for a short to ground and repair if necessary. Is the repair necessary?		Go to *Step 8*	Go to *Step 6*
6	Replace the instrument panel cluster. Refer to Section 9E, Instrumentation/Driver Information. Is the repair complete?		Go to *Step 8*	
7	Replace the PCM/ECM. Is the repair complete?		Go to *Step 8*	
8	1. Using the scan tool, clear the Diagnostic Trouble Codes (DTCs). 2. Attempt to start the engine. Does the engine start and continue to run?		Go to *Step 9*	Go to *Step 1*
9	1. Allow the engine to idle until normal operating temperature is reached. 2. Check if any DTCs are set. Are any DTCs displayed that have not been diagnosed?		Go to the applicable DTC table	System OK

FUEL SYSTEM DIAGNOSIS

Circuit Description

The fuel pump is an in–tank fuel pump mounted to a fuel sender assembly. The fuel pump will remain on as long as the engine is cranking or running and the powertrain control module (PCM)/engine control module (ECM) is receiving reference pulses from the crankshaft position (CKP) sensor. If there are no reference pulses, the PCM/ECM will turn off the fuel pump 2 seconds after the ignition switch is turned ON or 2 seconds after the engine stops running. The fuel pump delivers fuel to the fuel rail and the fuel injectors, where the fuel system pressure is controlled from 284 to 325 kPa (41 to 47 psi) by the fuel pressure regulator. The excess fuel is returned to the fuel tank.

Test Description

The number(s) below refer to step(s) on the diagnostic table.

2. When the engine is idling, the intake manifold vacuum is high. This vacuum is applied to the fuel pressure regulator diaphragm, offsetting the spring pressure inside the fuel pressure regulator and lowering the fuel pressure.
10. If there is fuel bleeding back through the fuel return outlet, this is due to a faulty fuel pressure regulator.
14. Another symptom often present when the fuel injectors are leaking is hard starting. Leaking fuel injectors can cause a flooding condition.
23. Fuel leaking from the fuel pump inlet is due to a faulty one–way check valve in the fuel pump.

CAUTION : The fuel system is under pressure. To avoid fuel spillage and the risk of personal injury or fire, it is necessary to relieve the fuel system pressure before disconnecting the fuel lines.

CAUTION : Do not pinch or restrict nylon fuel lines to avoid damage that could cause a fuel leak, resulting in possible fire or personal injury.

Fuel Pressure Relief Procedure

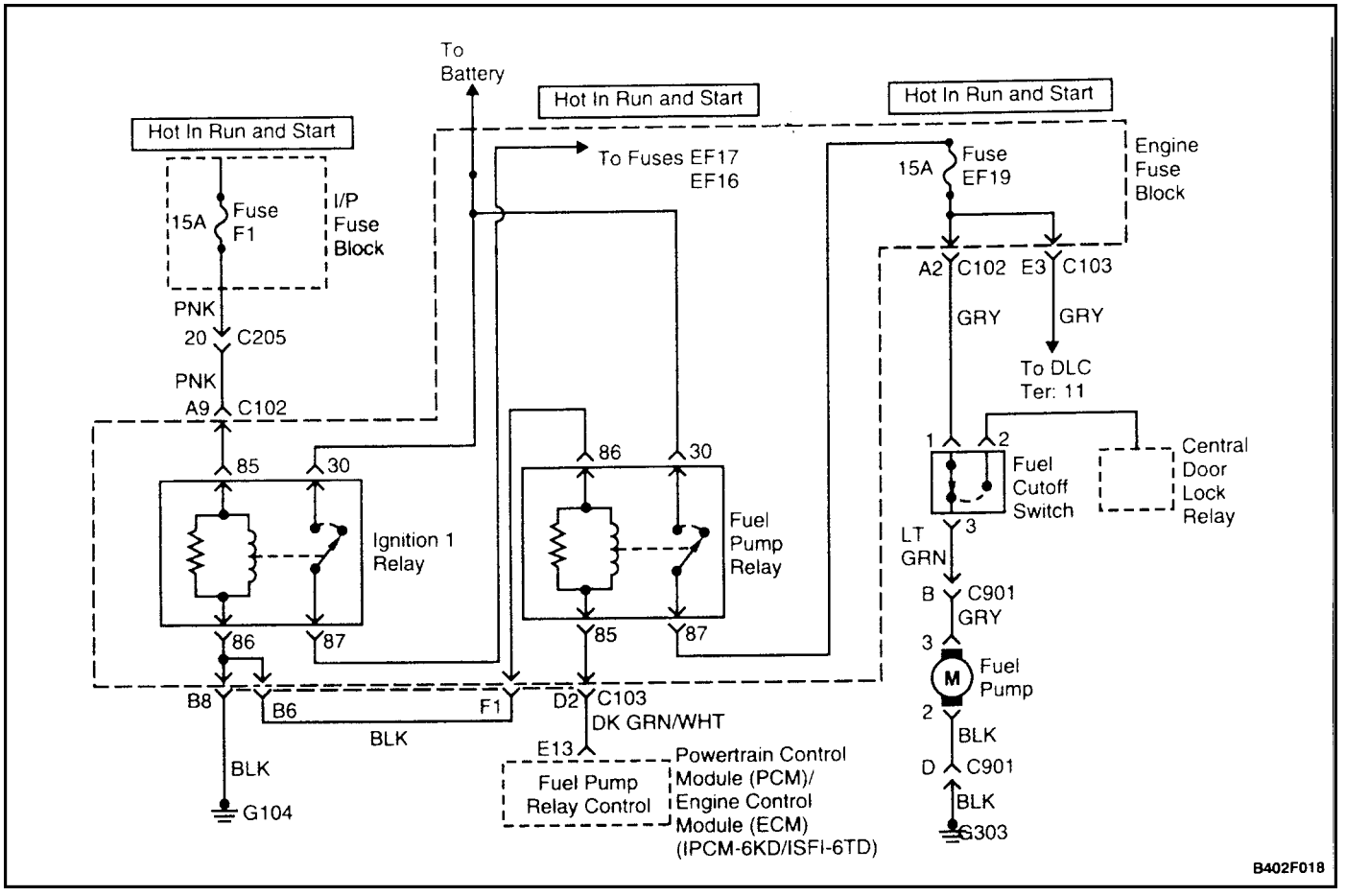
1. Remove the fuel cap.
2. Remove the fuel pump fuse EF18 from the engine fuse box.
3. Start the engine and allow the engine to stall.
4. Crank the engine for an additional 10 seconds.

Fuel System Diagnosis

Step	Action	Value(s)	Yes	No
1	1. Relieve the fuel system pressure. 2. Install a fuel pressure gauge. 3. Turn the ignition ON. Is the fuel pressure within the values specified and holding steady?	284–325 kPa (41–47 psi)	Go to *Step 2*	Go to *Step 5*
2	1. Disconnect the fuel pressure regulator vacuum hose. 2. Start the engine. 3. Allow the engine to idle. 4. Connect the fuel pressure regulator vacuum hose. Does the fuel pressure decrease?		System OK	Go to *Step 3*
3	1. Allow the engine to idle. 2. Disconnect the vacuum hose from the fuel pressure regulator. 3. Connect a vacuum pump with a gauge to the fuel pressure regulator vacuum port. 4. Apply 41–47 kPa (12–14 in. Hg) of vacuum to the fuel pressure regulator. Does the fuel pressure decrease?		Go to *Step 4*	Go to *Step 16*
4	1. Locate and correct the cause of the vacuum restriction to the fuel pressure regulator. 2. Confirm the operation of the fuel pressure regulator. Is the repair complete?		System OK	

Step	Action	Value(s)	Yes	No
5	1. Relieve the fuel system pressure. 2. Install a fuel pressure gauge. 3. Turn the ignition ON. Is the fuel pressure within the values specified but not holding steady?	284–325 kPa (41–47 psi)	Go to *Step 6*	Go to *Step 17*
6	Inspect the fuel lines for a leak. Is the problem found?		Go to *Step 7*	Go to *Step 8*
7	1. Replace the fuel line(s) as needed. 2. Install a fuel pressure gauge. 3. Turn the ignition ON. Is the fuel pressure within the values specified but not holding steady?	284–325 kPa (41–47 psi)	System OK	
8	1. Remove the fuel pump assembly. 2. With the fuel pump under pressure, inspect the fuel pump coupling hoses for leaking. Is the problem found?		Go to *Step 9*	Go to *Step 10*
9	1. Tighten or replace the fuel pump coupling hoses as needed. 2. Install a fuel pressure gauge. 3. Turn the ignition ON. Is the fuel pressure within the values specified but not holding steady?	284–325 kPa (41–47 psi)	System OK	
10	With the fuel system under pressure, inspect the fuel return outlet for leaking. Is the problem found?		Go to *Step 11*	Go to *Step 12*
11	1. Replace the fuel pressure regulator. 2. Install a fuel pressure gauge. 3. Turn the ignition ON. Is the fuel pressure within the values specified but not holding steady?	284–325 kPa (41–47 psi)	System OK	
12	With the fuel system under pressure, inspect the fuel inlet for leaking. Is the problem found?		Go to *Step 13*	Go to *Step 14*
13	1. Replace the fuel pump assembly. 2. Install a fuel pressure gauge. 3. Turn the ignition ON. Is the fuel pressure within the values specified but not holding steady?	284–325 kPa (41–47 psi)	System OK	
14	1. Remove the fuel rail and the fuel injectors as an assembly. 2. With the fuel system under pressure, inspect all of the fuel injectors for leaking. Is the problem found?		Go to *Step 15*	
15	1. Replace the leaking fuel injector(s). 2. Install a fuel pressure gauge. 3. Turn the ignition ON. Is the fuel pressure within the values specified but not holding steady?	284–325 kPa (41–47 psi)	System OK	

Step	Action	Value(s)	Yes	No
16	1. Replace the fuel pressure regulator. 2. Disconnect the fuel pressure regulator vacuum hose. 3. Start the engine. 4. Allow the engine to idle. 5. Connect the fuel pressure regulator vacuum hose. Does the fuel pressure decrease?		System OK	
17	1. Relieve the fuel system pressure. 2. Install a fuel pressure gauge. 3. Turn the ignition ON. Is the fuel system pressure below the values specified and holding steady?	284–325 kPa (41–47 psi)	Go to *Step 13*	Go to *Step 18*
18	1. Relieve the fuel system pressure. 2. Install a fuel pressure gauge. 3. Turn the ignition ON. Is the fuel system pressure below the values specified and holding steady?	284–325 kPa (41–47 psi)	Go to *Step 19*	
19	Inspect the fuel lines for leaks. Is the problem found?		Go to *Step 7*	Go to *Step 20*
20	1. Remove the fuel pump assembly. 2. With the fuel pump under pressure, inspect the fuel pump coupling hoses for leaking. Is the problem found?		Go to *Step 9*	Go to *Step 21*
21	1. Remove the fuel pump assembly. 2. With the fuel system under pressure, inspect the fuel return outlet for leaking. Is the problem found?		Go to *Step 11*	Go to *Step 22*
22	1. Remove the fuel pump assembly. 2. With the fuel system under pressure, inspect the fuel inlet for leaking. Is the problem found?		Go to *Step 13*	Go to *Step 23*
23	1. Remove the fuel rail and the fuel injectors as an assembly. 2. With the fuel system under pressure, inspect all of the fuel injectors for leaking. Is the problem found?		Go to *Step 15*	Go to *Step 13*



FUEL PUMP RELAY CIRCUIT CHECK

Circuit Description

When the ignition switch is turned ON, the powertrain control module (PCM)/engine control module (ECM) will activate the fuel pump relay and run the in–tank fuel pump. The fuel pump will operate as long as the engine is cranking or running and the PCM/ECM is receiving ignition reference pulses.

If there are no reference pulses, the PCM/ECM will shut off the fuel pump within 2 seconds after the ignition switch is turned ON.

Diagnostic Aids

An intermittent problem may be caused by a poor connection, rubbed through wire insulation, or a broken wire inside the insulation.

Test Description

The number(s) below refer to step(s) on the diagnostic table.

3. This step checks for the PCM/ECM providing a ground for the operation of the fuel pump relay.
7. By confirming that the wiring is OK using Steps 2 through 6, it can be determined that the fuel pump relay is at fault.
9. After determining that there is no ground being provided by the PCM/ECM to the fuel pump relay, the fault is either the PCM/ECM or the wiring between the PCM/ECM and the fuel pump relay.

Fuel Pump Relay Circuit Check

Step	Action	Value(s)	Yes	No
1	1. Turn the ignition OFF for 10 seconds. 2. Turn the ignition ON. 3. Listen for in–tank fuel pump operation. Does the fuel pump operate for the time specified?	2 sec	System OK	Go to *Step 2*
2	1. Turn the ignition OFF. 2. Disconnect the fuel pump relay. 3. Connect a test light between the fuel pump relay connector terminal 86 and battery positive. 4. Turn the ignition ON. Is the test light on?		Go to *Step 3*	Go to *Step 8*
3	1. Turn the ignition OFF. 2. Connect a test light between the fuel pump relay connector terminal 85 and battery positive. 3. Turn the ignition ON. 4. With the ignition ON, the test light should light for the time specified. Is the test light on?	2 sec	Go to *Step 4*	Go to *Step 9*
4	1. Turn the ignition OFF. 2. Connect a test light between the fuel pump relay connector terminal 30 and ground. Is the test light on?		Go to *Step 5*	Go to *Step 11*
5	Check for an open or short to ground in the wire between the fuel pump relay connector terminal 87 and the fuel cutoff switch terminal 1. Is the problem found?		Go to *Step 6*	Go to *Step 7*
6	1. Repair the wire between the fuel pump relay connector terminal 87 and the fuel cutoff switch terminal 1. 2. Install the fuel pump relay. 3. Turn the ignition OFF for 10 seconds. 4. Turn the ignition ON. Does the fuel pump operate for the time specified?	2 sec	System OK	
7	1. Replace the fuel pump relay. 2. Turn the ignition OFF for 10 seconds. 3. Turn the ignition ON. Does the fuel pump operate for the time specified?	2 sec	System OK	
8	Check for an open wire between the fuel pump relay connector terminal 86 and the ignition 1 relay connector terminal 86. Is the problem found?		Go to *Step 13*	Go to ”Ignition 1 Relay Circuit Check”
9	Check for an open wire between the fuel pump relay connector terminal 85 to the powertrain control module (PCM)/engine control module (ECM) connector terminal E13. Is the problem found?		Go to *Step 10*	Go to *Step 12*

Step	Action	Value(s)	Yes	No
10	1. Repair the wire between the fuel pump relay connector terminal 85 to the PCM/ECM connector terminal E13. 2. Install the fuel pump relay. 3. Turn the ignition OFF for 10 seconds. 4. Turn the ignition ON. Does the fuel pump operate for the time specified?	2 sec	System OK	
11	1. Repair the wire between the fuel pump relay connector terminal 30 and the battery. 2. Install the fuel pump relay. 3. Turn the ignition OFF for 10 seconds. 4. Turn the ignition ON. Does the fuel pump operate for the time specified?	2 sec	System OK	
12	1. Replace the PCM/ECM. 2. Turn the ignition OFF for 10 seconds. 3. Turn the ignition ON. Does the fuel pump operate for the time specified?	2 sec	System OK	
13	Repair the wire between the fuel pump relay connector terminal 86 and the ignition 1 relay connector terminal 86. Is the repair complete?		System OK	